REMARKS

Claims 8, 9, and 14-20 are currently pending in the application.

Claims 8, 14, 16, and 18-20 have been amended to recite that the open space between the flange of the split tee and the steel column is such that plasticization of the flange of the split tee in the tensile or compressive direction is allowed. Support for the amendment is found, for example, at page 24, lines 8-21, and Figure 12(b) of the specification. Figure 12(b) shows that in the presently claimed column and beam structure, the open space between the flange and column must be sufficient to allow plasticization of the flange in the tensile or compressive direction (indicated respectively in the figure by dot-dashed curved lines).

No new matter has been introduced by the present amendments. Entry of the foregoing amendments and consideration of the following remarks are respectfully requested.

Rejections under 35 U.S.C. § 103(a)

Claims 8, 16, 18, and 20 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over JP 05-263469 to Furuumi ("Furuumi") in view of U.S. Patent No. 6,059,482 to Beauvoir ("Beauvoir") and U.S. Patent No. 4,905,436 to Matsuo et al. ("Matsuo") for the reasons set forth on pages 2-4 of the Office Action.

The present invention provides a column and beam join structure capable of minimizing damages to the structure by plasticizing the split tee in advance of the column and beam so as to absorb energy of external forces when the external forces such as an earthquake or strong wind acts on the structure, thereby preventing the external forces from acting on the column and beam. In the column-beam join structure of the present invention, in order to plasticize the split tee in advance of the column and beam, an open space is provided between the column and the flange of the split tee across the entire length of the flange perpendicular to the axial direction of the steel column at least at a region corresponding to the extended direction of the web of the split tee by, *e.g.*, inserting a space keeping member between the column and flange of the split tee. A portion of the flange of the split tee facing the open space can plasticize in advance of the column and beam and absorb energy of external forces when the external forces such as an earthquake or strong wind acts on the structure. Figure 12(b) of the present application shows plasticization of the flange of the split tee in the tensile or compressive direction. As can be seen from Figure 12(b), the open space must be sufficient to allow such plasticization.

In contrast, Furuumi discloses an open space between the column and the flange in a direction *parallel* to the axis of the steel column (*see, e.g.,* the space between spacers 2 in Figure 1 of Furuumi). Since the open space between the flange of the split tee and the column exists in the direction *parallel* to the axis of the steel column, and thus perpendicular to the direction of flange plasticization, it does not serve the function of allowing the flange to deform. When the force acts on the beam, it is transferred from the web of the split tee to the column via a flange, and the flange is tensioned as a whole and partial deformation of the flange does not occur and the split tee cannot be plasticized to absorbe the energy of the force. In the present invention, since the open space between the flange of the split tee and the column is provided in the direction *perpendicular* to the axis of the steel column and at the region corresponding to the web of the split tee, when the force acts on the web of the split tee, the flange corresponding to the portion where the open space is provided plasticizes and absorbs the energy of the force. Thus, this difference between parallel and perpendicular open spaces affects the plasticization of the split tee and the absorption ability of energy from an external force. Therefore, Furuumi does not disclose or suggest the column-and-beam join structure of the present invention.

Beauvoir also does not disclose an open space provided between the column and the flange of the split tee across the entire length of flange perpendicular to the axis of the steel column of the split tee. The flange of Beauvoir is merely *tapered* and does not have the cross-sectional shape of the present invention for promoting plasticization (*see, e.g.*, Beauvoir Figure 7). Therefore, Beauvoir does not cure the deficiencies of Furuumi.

The above is admitted in the Office Action on page 4, where it states that Furuumi and Beauvoir "lack[s] the open space along the entire length of the flange perpendicular to the axial direction of the steel column," but instead, the Office Action refers to Figure 14 of Matsuo as allegedly disclosing this feature.

However, Matsuo does not teach or suggest providing an open space to allow plasticization of the flange of the split tee in the tensile or compressive direction. Figure 14 of Matsuo shows an open space 10c, which is a split portion provided in a direction perpendicular to the axis of the column in order to divide the strip portion 10 into a plurality of pieces. The open space 10c, however, is not for the purpose of allowing plasticization of the flange. This is evidenced by the narrow dimension of the space. For example, a comparison of the width of open space 10c and the thickness of the flange of the beam 2a of Matsuo with Figure 12(b) of the present application clearly shows that the space 10c of

Matsuo would not allow plasticization of the flange of the split tee in the tensile or compressive direction. Therefore, Matsuo also does not cure the deficiencies of Furuumi.

Accordingly, the rejection of claims 8, 16, 18, and 20 as obvious under 35 U.S.C. § 103(a) over Furuumi in view of Beauvoir and Matsuo cannot stand, and should be withdrawn.

Claims 14 and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Furuumi in view of Matsuo and Beauvoir for the reasons set forth on pages 4-6 of the Office Action.

As discussed above, Furuumi, Beauvoir and Matsuo do not teach or suggest the present invention. Specifically, they do not teach or suggest the features of a sufficient open space between the column and the flange of the split tee to allow plasticization of the flange of the at least one split tee in the tensile or compressive direction.

Accordingly, the rejection of claims 14 and 19 as obvious under 35 U.S.C. §103(a) over Furuumi in view of Matsuo and Beauvoir cannot stand, and should be withdrawn.

Claims 9 and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Furuumi, Matsuo, and Beauvoir in further view of U.S. Patent No. 6,754,992 to Byfield et al. ("Byfield") for the reasons set forth on pages 6-7 of the Office Action.

Byfield does not disclose or suggest an open space oriented perpendicular to the axis of the column between the flange of the split tee and the column, providing for the flange of the split tee to plasticize prior to the column and beam. Although Byfield discloses flanges having a partially reduced region as depicted in Figures 19 and 20, such flanges, when attached to column 1 as shown in Figure 1 of Byfield, would have led to an open space oriented *parallel* to the axial direction of the column. Therefore, Byfield does not cure the deficiencies of Furuumi, Matsuo, and Beauvoir.

Furthermore, in the present invention, the web of the split tee is connected to the flange of the beam by bolting, while in Byfield, as shown in Figures 1, 2, 8-10, 12-13, 25, 27 and 28, the web of the connector (split tee) is connected to the web of the beam by engaging with studs and not by bolting. Therefore, the joining form of the present invention is completely different than Byfield.

Accordingly, the rejection of claims 9 and 17 as obvious under 35 U.S.C. §103(a) over Furuumi, Matsuo, and Beauvoir in further view of Byfield cannot stand, and should be withdrawn.

Conclusion

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

Respectfully submitted,

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